

Report on 2019 ISSSSP Identification Training and Inventory/Monitoring Surveys for Two Sensitive Dragonfly Species (*Aeshna sitchensis* and *A. subarctica*) on the Mt Hood, Willamette and Deschutes National Forests

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Summary

*In response to the 2019 addition of the zigzag darner (*Aeshna sitchensis*) to the sensitive species list of the Mt Hood (MTH), Willamette (WNF) and Deschutes (DNF) National Forests and the subarctic darner (*A. subarctica*) to the sensitive species list of the Mt Hood National Forest, we initiated a project with The Xerces Society to develop an identification guide for darners, conduct darner surveying and identification training for field going personnel, and conduct limited surveys of potential habitat on the three forests. A field identification guide for zigzag darner and subarctic darner was prepared by Michele Blackburn of The Xerces Society and is on file at the Region 6 Interagency Special Status Sensitive Species Program (ISSSSP) website (<https://www.fs.fed.us/r6/sfpnw/issssp/>).*

Two identification training sessions (one on MTH and one on WNF) were conducted by Michele Blackburn in August 2019 and attended by a total of 37 people, which included wildlife biologists, botanists, fish biologists and hydrologists.

Following the training sessions, 48 sites were surveyed for the two sensitive dragonfly species, including 26 sites on the WNF, 6 sites on the MTH, and 16 sites on the DNF. Some sites were surveyed multiple times. The survey areas and observations have been entered into the Forest Service NRM Wildlife database.

*On the WNF, the sensitive dragonfly species were not found during any of the surveys. Three survey visits were conducted at Gold Lake Bog, which has a single record from 2004 of the zigzag darner. The uncommon black-tipped darner (*Aeshna tuberculifera*) was found at one location on the McKenzie River Ranger District, however, and the sensitive western bumble bee (*Bombus occidentalis*) was found at Gold Lake Bog. Also, two northern waterthrush (*Seiurus noveboracensis*) were detected at Hills Peak Bog on August 26.*

On the MTH, 10 subarctic darners were found at the Camas Prairie survey site. This is one of two historic sites for this species on the Forest. Although previously recorded at Little Crater Lake Meadows, zigzag darners were not found there during the survey effort, though much of the meadow at this location seemed dry, which may have contributed to the lack of zigzag darner sightings.

On the DNF, the sensitive zigzag darner was found during one of the four survey visits at Sparks Lake. The last reported sighting and survey visit there was in 2002. The other known historic location on the forest, Strider Lake, was visited twice in 2019 with no positive results.

Introduction:

This report summarizes the results of an ISSSSP funded project to 1) develop a training guide for two new dragonfly sensitive species (zigzag darner and subarctic darner) in the northern Cascade region of Oregon, 2) train field biologists on proper field survey and identification methods for these dragonfly

species and 3) provide limited support for dragonfly surveys in known and potential habitat on the Mt Hood, Willamette and Deschutes National Forests.

Both darner species were added to the sensitive species list of Oregon national forests in the spring of 2019 based on documented locations on those forests. The subarctic darner was added to the Mt Hood National Forest sensitive species list based on past observations at three sites on the forest: Camas Prairie, Little Crater Lake, and Clackamas Lake. The zigzag darner was added to the Mt Hood and Willamette National Forests sensitive species list based on past observations at one site on each forest: Little Crater Lake (MTH) and Gold Lake Bog (WNF). The zigzag darner was added to the Deschutes National Forest sensitive species list based on past observations at two sites on the forest: Sparks Lake and Strider Lake. Because biologists on the forests mostly had little to no experience with these species prior to their listing as Forest Service sensitive, training of field-going personnel was needed. Also it was assumed that because dragonfly surveys have not been routinely done by the Forest Service biologists on the forests, there is a likelihood that additional sites may be occupied by the sensitive species and thus a need to develop survey expertise to manage for these species.

Methods:

Identification Guide and Survey Training:

The Forest Service enlisted The Xerces Society to prepare a field identification guide for the two dragonfly sensitive species and similar darner species that could be encountered while conducting surveys on the three forests. The Xerces Society was also funded to conduct field identification training at the Middle Fork District of the WNF and on the Zigzag Ranger District of the MTH. The identification sessions consisted of a morning of classroom presentation and discussion followed by an afternoon of field inventory at one of the historic site locations on forests. Gold Lake Bog and Little Crater Lake Meadows were the sites surveyed for the respective Willamette and Mt Hood identification sessions. Michele Blackburn was the species expert at the Xerces Society that developed the guide and conducted the training.

Surveys:

Surveys were conducted on all three forests. As part of the training, Michele prepared a power point presentation on surveying and monitoring for the sensitive species. Most of the information below on surveying comes from that presentation and was used to guide where and when surveys were conducted.

Because the darners mostly fly and do not regularly perch, it is generally necessary to capture individuals in a net and examine them in hand to assure correct species identification. Surveys should typically avoid rain, temperatures less than 59 degrees or above 88 degrees Fahrenheit, and winds above 18 mph. Surveys should also avoid hours near sunrise and sunset. The more individual darners captured and identified, the better chances of documenting all the species present. As a minimum, there must be at least 60 minutes of search time spent at a site to be considered a survey visit, and it is desirable to conduct several visits to a site during the flight period to determine the presence/absence of the target species at the site. When capturing dragonflies, care must be taken not to injure teneral (recently emerged) individuals that still have soft exoskeletons and wings.

The flight period of the subarctic darner is late June to early October. Typical habitat is upland fens, wet meadows, and mossy bogs, including *Sphagnum*. The species likes well-vegetated pools including bog pools with *Eriophorum*. On Mt Hood National Forest, it has been found at about 3,000 to 3,500 feet elevation.

The flight period of the zigzag darner is relatively short, being from late August to late September. Typical habitat is fens, wet meadows, and bogs with seasonal and permanent pools. It is typically found in shallow cool-water pool habitat with little open water and low sedges and mosses near shrublands (e.g., willows) or woodlands. On MTH, the one known location is at 3,360 feet elevation. The single detection of the species at Gold Lake Bog on the WNF is at 4,800 feet elevation. The locations on the DNF are at 5,000 feet (Strider Lake) and 5,500 feet (Sparks Lake). Unlike most darners, the zigzag darner may perch horizontally on the ground or logs or hang from clumps of sedge or trees.

Vouchering adult darners involves photographing the face (facial line), the top of the head (“T-spot”), the thorax and upper appendages (side view of lateral strip and appendages), and the abdomen including the top and bottom of the abdomen and the tip (S10). Individuals can be released unharmed after photographing. Information collected for the specimens identified should include date, location, species, gender or male/female pairs, behavior (e.g., ovipositing, flying, perching, mating), and habitat notes.

Survey areas, visits and observations were entered into the Forest Service’s NRM Wildlife database.

Results and Discussion:

A field identification guide for the zigzag and subarctic darners, plus seven similar blue darners likely to be found in our area was completed by The Xerces Society and is on file at the ISSSSP website (<https://www.fs.fed.us/r6/sfpnw/issssp/>). Surveyors found the descriptions and charts very useful and, after a little practice, felt confident in identification of the darners. One recommendation is that, in the identification chart for the zigzag darner, the light spot at the base of the T is missing in the drawing and lead some surveyors to incorrectly assume that that was a distinguishing characteristic (since it is shown for all the other species). Voucher photographs seemed reliable for positive identification by experts. We did find an additional darner species (the black-tipped darner), which is not described in the field guide. We recommend that this species be added to any updates of the Xerces guide for this area. Also, because dragonfly distribution is still being determined for some species, we recommend that surveyors carry a larger statewide or regional Odonate guide in case an unusual species is encountered during the surveys.

The Xerces power point presentation on surveying and monitoring for darners is on file at above ISSSSP website and we recommend surveyors review that document, which contains much useful information related to the target darner species and dragonfly surveying in general. The detection of sensitive darner species in this project is consistent with the survey periods identified in the Xerces survey protocol. Survey results are discussed for each forest below.

Willamette National Forest:

Twenty-six sites were surveyed for darners on the forest from August 14 to September 24, 2019 (Table 1). Exceptionally cold rainy weather in much of mid to late September curtailed numerous planned days during that time. No zigzag darners or subarctic darners were found. Survey effort included three visits to Gold Lake Bog. During each visit at Gold Lake Bog, we encountered one to three other dragonfly experts or “Citizen Scientists” looking for the zigzag darner. This level of interest in dragonflies was unknown to the Forest Service biologists prior to this project. The presence of zigzag darners at Gold Lake Bog is based on a single record in 2004 and several of the people we met expressed an opinion that the record may have been an accidental wanderer and not representative of a resident population.

Six species of blue darners plus the common green darner (*Anax junius*) were documented during these surveys. The most outstanding find was a single detection of a black-tipped darner at Wolf Meadow on the McKenzie River Ranger District. This is an uncommon species with only a few detections in Lane County (Jim Johnson personal correspondence to Svea Zimmermann, 10/23/2019). Among other

sensitive species, we had a detection of western bumble bee at Gold Lake Bog, which is a new site for this species on the Middle Fork District. We also had a detection of two northern waterthrush at Hills Peak Bog on August 26. This is the first record of this species at this site and the first recorded observation of the species on the WNF by a Forest Service biologist. Because of the date, it may not represent breeding at this site, although the habitat fits the description of breeding habitat for the species in Oregon.

The McKenzie River Ranger District developed a form for the dragonfly surveys and an example of it is attached in Appendix A in case other surveyors find it useful.

Mt Hood National Forest:

Six sites were surveyed for darners on the forest from August 22 to September 5, 2019 (Table 2). Exceptionally cold rainy weather in much of mid to late September curtailed numerous planned days during that time. Ten subarctic darners were found at Camas Prairie on September 4, however no zigzag darners were found. No sensitive species of darners were identified at the other sites. Survey effort included Clackamas Lake and Little Crater Lake, sites of historic subarctic and zigzag records.

Five darner species were confirmed, with a 6th possible (the black-tipped darner), but unconfirmed. At least 2 non-darner species were recorded as well. The most prevalent species was the shadow darner accounting for 50.7% of all records (n=67) across all sites. This species was confirmed at 5 location with a possible occurrence at the 6th site (Camas Prairie).

Deschutes National Forest:

Sixteen sites were surveyed for darners on the forest from September 4 to October 7, 2019 (Table 3). Cold weather in late September curtailed several planned days during that time. Five species of blue darners plus the common green darner (*Anax junius*) were documented during these surveys. A single detection of a zigzag darner at Sparks Lake on the Bend-Ft. Rock Ranger District was the highlight of the survey effort. Although the zigzag darner eluded capture (actually, it was unknowingly netted and released), photos of it were taken as it perched on the side of an old wooden fence post. From the photos, positive identification was confirmed by district biologists, along with verification from local expert Jim Johnson (<http://odonata.bogfoot.net/>) via email. This observation also extended the known late flight date for the species in Oregon (Jim Johnson personal correspondence to John Lowe, 09/24/2019).

Management Implications:

The purpose of this project was training and initial surveys for darners and not directed at specific managements needs for the species. Jordan (2010 and 2011) identifies threats to the species and discusses conservation considerations for the zigzag and subarctic darners. Some management considerations are discussed below.

Mt Hood National Forest:

Subarctic darners were found to persist at Camas Prairie. This site is an area of management interest for the Forest and USFWS due to the presence of the Oregon spotted frog (*Rana pretiosa*) and the development of a site management plan is underway. It needs to be determined if the subarctic darner needs to be included in the management plan as well.

Little Crater Meadow is a *Sisyrinchium sarmentosum* (pale blue-eyed grass) site and is managed for that species. This management focus helps protect habitat needed by zigzag and subarctic darners.

Willamette National Forest

The one known zigzag darner site on the Forest at Gold Lake is in a Research Natural Area that maintains the habitat as pristine. There is an Oregon spotted frog site management plan for this area that periodically monitors for impacts to wetland habitat from recreational use (e.g., evidence of trampling, garbage, dispersed camping, fire pits). To date we have found little evidence of adverse impacts to the bog habitat from visitor use.

All three forests have a need for additional darner surveys to determine if other sites for the sensitive darner species occur on those forests.

Acknowledgements:

Numerous Forest Service people and volunteers participated in the dragonfly surveys. Their effort was greatly appreciated and has been documented in the NRM_Wildlife surveys. Michele Blackburne did an exceptional job with the various edits of the training and identification material and her enthusiasm during the classroom and field sessions inspired a new group of dragonfly enthusiasts. Much of the training material came from Cary Kerst and Steve Gordon's excellent 2011 book "Dragonflies and Damselflies of Oregon." Jim Johnson provided valuable information on the darner species and their known flight periods and helped with the identification of voucher photographs.

Literature Cited:

Jordan, S. F. 2010. Species Fact Sheet for *Aeshna sitchensis* (Zigzag Darner). Unpublished Report, Interagency Special Status Species Program (USDI Bureau of Land Management and USDA Forest Service), Portland, OR. [accessed 3/16/2018 from <http://www.fs.fed.us/r6/sfpnw/issssp/species-index/fauna-invertebrates.shtml>]

Jordan, S. F. 2011. Species Fact Sheet for *Aeshna subarctica* (Subarctic Darner). Unpublished Report, Interagency Special Status Species Program (USDI Bureau of Land Management and USDA Forest Service), Portland, OR. [accessed 3/16/2018 from <http://www.fs.fed.us/r6/sfpnw/issssp/species-index/fauna-invertebrates.shtml>]

Table 1. Results of 2019 Darner Surveys, Willamette National Forest.

District/Site Name	Date	Darner Species Found*
Middle Fork Ranger District		
Gold Lake Bog	August 14	AEIN, AEPA
	August 15	AEIN, AEPA
	September 4	AEIN, AEPA, AEUM
Hills Peak Bog	August 26	AEIN, AEUM
Loletta Lakes	August 27	AEPA, AEUM, ANJU
Warfield Bog	September 4	AEPA, AEUM
Torrey Mire	September 12	AEIN, AEPA, AEUM, ANJU
McKenzie River Ranger District		
Hidden Lake	August 19	AEIN, AEPA
	September 24	AEUM
Ikenick Ponds	September 12	AEPA, AEUM, AECA
Irish Camp Lake	September 11	AEUM, AEPA
Patjens Lakes	September 13	AEUM, AEPA
Quaking Aspen Swamp	August 26	AEPA, AEUM, AECA
	September 5	AEUM, AEPA
Robinson Lake	August 30	AEUM, AEPA
Scott Lake	August 29	AEPA, AEIN, AECA
Wolf Meadow	September 6	AECA, AEIN, AEPA, AETU
Wolverine Meadow	August 27	AEUM, AEPA, AEIN, AECA
	September 4	AEUM, AEPA, AEIN, AECA
Sweet Home Ranger District		
317 Road Pond	September 5	AECA
Echo Basin	September 5	No darners-may have been too cold
Parish Lake	September 3	AECA, AEPA, AEJU, AEUM
Daly Lake	September 6	AEUM
Gordon Lakes	September 4	AEPA, AEUM
Gordon Bog	September 4	AEUM
Flam Bog	September 12	AEPA, AEUM
Whiterock Bog	September 12	AEPA, AEJU
Detroit Ranger District		
Bruno Meadow	August 27	AEUM
Tule Lake and Fens	August 27	AEIN, AEPA, AEUM
Toad Creek Meadow	September 12	AEUM
Upper Pigeon Prairie	September 12	AEPA, AEUM
*Darner species: AEIN: Variable darner; AEPA: Paddle-tailed darner; AEUM: Shadow darner; AECA: Canada darner; AETU: Black-tipped darner; AEJU: Sedge darner; ANJU: Common green darner In bold highlight are sites with historic zigzag darner sightings.		

Table 2. Results of 2019 Darner Surveys, Mount Hood National Forest.		
Site Name	Date	Darner Species Found*
Little Crater Lake	August 22	AECA, AEPA, AEUM, Non-Darner
Enid Lake	August 28	AEPA, AEUM, AEJU
Skibowl East Multitpor Fen	August 28	AEPA, AEUM
Clackamas Lake	September 3	AEPA, AEUM
Camas Prairie	September 4	AESU, AECA, AEPA, Unknown
Meadow North of Trillium Lake	September 5	AEUM
*Darner species: AESI: Zigzag darner; AESU: Subarctic Darner; AEIN: Variable darner; AEPA: Paddle-tailed darner; AEUM: Shadow darner; AECA: Canada darner; AEJU: Sedge darner; ANJU: Common green darner In bold highlight are sites with historic zigzag and/or subarctic darner sightings.		

Table 3. Results of 2019 Darner Surveys, Deschutes National Forest.		
District/Site Name	Date	Darner Species Found*
Bend-Ft. Rock Ranger District		
Sparks Lake	September 4	AEPA, AEJU, AEIN
	September 23	AESI, AEPA, AEJU, AEIN
	September 26	AEPA, AEUM, AEIN
	October 7	One darner seen, not caught
Deer Creek Meadow	September 6	ANJU
Upper Blue Pool Fen	September 6	No darners seen
Lower Blue Pool	September 13	AEPA, AEJU
Hosmer Lake	September 13	AEPA
	September 24	AECA, AEPA, AEIN
	September 26	AEPA, AEIN
Strider Lake	September 12	AEPA, AEUM
	September 26	AEUM
Cow Meadow	September 25	No darners seen
Wire Meadow	September 6	No darners seen
Brown's Meadow	September 25	One darner seen, not caught
Big Meadow	September 25	AEUM
Mid Meadow	September 25	AEUM
Todd Creek Meadow	September 25	Darners seen, not caught
Sisters Ranger District		
Little 3 Creeks Lake	September 6	None seen flying; too cold and wet?
3 Creeks Lake	September 6	A few darners seen flying; could not catch
Trout Creek Swamp	September 6	No darners observed
Lava Camp Lake	September 6	AEPA, AEUM
Crescent Ranger District		
No Surveys		
*Darner species: AESI: Zigzag darner; AEIN: Variable darner; AEPA: Paddle-tailed darner; AEUM: Shadow darner; AECA: Canada darner; AEJU: Sedge darner; ANJU: Common green darner In bold highlight are sites with historic zigzag darner sightings.		

Appendix A. Darner Survey Form Example, McKenzie River Ranger District.

Survey/Weather Information

Site Name: Wolf Meadow	Date: 9/6/19	Observers: Rothenbuecher, Zimmermann
Start Time: 12:30	End Time: 15:00	Survey Minutes: 150
Notes (e.g. weather conditions): sunny, warm (~70 deg), cloud cover during beginning 20%, later 0%		

Please mark the survey area on a map and attach it to this form!

Observations

Please be sure to take photos of diagnostic features such as facial line, T-spot, thoracic stripes and appendages for verification of sensitive species and if you're unsure of your ID!

Species/Sex/Paired	UTM in NAD83 (for sensitive species)	Behavior/Reproductive Stage	Habitat features	Notes (e.g. photo#)
<i>A. canadensis</i> /m/no		Hovering	Emergent vegetation	-
<i>A. canadensis</i> /m/no		Hovering	Emergent vegetation	-
<i>A. interrupta</i> /f/yes		Mating wheel, flying	Emergent vegetation	-
<i>A. interrupta</i> /m/yes		Mating wheel, flying	Emergent vegetation	-
<i>A. interrupta</i> /m/no		Patrolling	Emergent vegetation	-
<i>A. palmata</i> /m/no		Patrolling	Emergent vegetation	-
<i>A. canadensis</i> /m/no		Patrolling	Emergent vegetation	-
<i>A. canadensis</i> /m/no		Patrolling	Emergent vegetation	-
<i>A. canadensis</i> /m/no		Patrolling	Emergent vegetation	-
<i>A. canadensis</i> /m/no		Patrolling	Emergent vegetation	-
<i>A. canadensis</i> /m/no		Patrolling	Emergent vegetation	-
<i>A. canadensis</i> /m/no		Patrolling	Emergent vegetation	-
<i>A. palmata</i> /m/no		Patrolling	Emergent vegetation	-

Species/Sex/Paired	UTM in NAD83 (for sensitive species)	Behavior/Reproductive Stage	Habitat features	Notes (e.g. photo#)
<i>A. interrupta</i> /f/no		Perching	Sedge near water	-
<i>A. palmata</i> /m/no		Hovering	Sedges, em. veg. over water	-
<i>A. tuberculifera</i> /m/no		Patrolling	Sedges, em. veg. over water	WfM_ATub01
<i>A. interrupta</i> /f/no		Ovipositing	Log in water	-
<i>A. interrupta</i> /m/no		Patrolling	Emergent vegetation	-
<i>A. palmata</i> /m/no		Patrolling	Emergent vegetation	-
<i>A. interrupta</i> /m/no		Trapped in water	Water, lily pads	-
<i>A. interrupta</i> /m/no		Patrolling	Water, lily pads	-
<i>A. palmata</i> /m/no		Patrolling	Emergent vegetation	-
<i>A. palmata</i> /m/no		Fighting with mating male	Sedges near water	-
<i>A. interrupta</i> /m/yes		Fighting with male; headlock position with female	Sedges near water	-
<i>A. interrupta</i> /f/yes		Headlock position	Sedges near water	-
<i>A. palmata</i> /m/no		Patrolling	Sedges	-
<i>A. canadensis</i> /m/no		Patrolling	Emergent vegetation	-
<i>A. palmata</i> /m/no		Patrolling	Emergent vegetation	-
<i>A. palmata</i> /m/no		Patrolling	Emergent vegetation	-